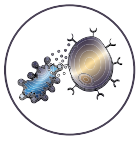
Chanie, et al., J Immunol Tech Infect Dis 2014, 3:1
http://dx.doi.org/10.4172/2329-9541.1000123



Journal of Immunological Techniques in Infectious Diseases

Research Article

A SCITECHNOL JOURNAL

Prevalence of HIV Infection among VCT Users and Assessment of Socio-Demographic Factors Affecting the Follow-Up Status of Clients on ART in Gondar Town, Northwest Ethiopia

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Abstract

Voluntary counseling and testing (VCT), for HIV infection, allows individuals to determine their HIV status and serves as a gateway for both HIV prevention and early access to Antiretroviral Therapy (ART) for sero-positive clients. However, very little is known about these profiles and HIV prevalence of VCT clients in Gondar town. A cross-sectional study design was carried out by collecting retrospective data from VCT clients' records inprivate and government health centers (July 2005-July 2009) and ART charts (July 2004-July 2007), from government health institutions, to assess the prevalence of HIV infection among VCT users and assess socio-demographic factors affecting the follow-up status of ART clients in Gondar Town. A total of 47,830 VCT and 942 ART charts were found during data collection and analyzed using EPI-Info and SPSS. A little over half - 24,459 (51.1%) of the VCT clients were females and the major age group of the clients was 20-24 years 18,002 (37.6%). The majority of the clients, 29,652 (62%), were never married and more than one-third 18,376 (38.4%) had attended secondary school. Prevalence of HIV infection among VCT clients was estimated to be 19.8% and varied by socio-demographic characteristics of the clients. Most of these variables included in the regression model of ART had significant effects. Sex, number of family members in the household, availability of community and religious supports, intention of the client to accept recommendations of the ART counselor and duration of the client on ART had significant influence on ART follow-up status of ART clients than others ($p<0.05$ for each factor). Considering the prevailing high level of HIV infection in the town among VCT clients, appropriate Behaviour Change Communication (BCC) strategies need to be designed. ART services have to be accessible in more health centers, which favor clients with low socioeconomic status by including the rural population also into consideration. Furthermore, there should be strong referral linkages between VCT and ART services for the provision of care and support.

Keywords

Gondar town; VCT; ART; HIV; BCC; AIDS

Introduction

HIV/AIDS has become a prevalent disease and presents a global public health concern. Estimates indicate that over 40 million people worldwide are infected with human immunodeficiency virus (HIV), the cause of AIDS [1]. Unfortunately, a cure is yet to be found for this ailment that was discovered 30 years ago. More than half of all new HIV infections occur in 15 to 24 year-olds. People within this age range erroneously believe that they are less susceptible to adverse outcomes associated with risk behaviors and are therefore at greater risk of acquiring the HIV/AIDS. Furthermore, high-risk behaviors established in youth often extend into adulthood, making intervention at a younger age imperative to prevent chronic risk behaviors [2].

The United Nations estimates that nearly 70 million people worldwide will die due to AIDS related illnesses over the next 20 years and the majority of these deaths will occur in developing countries like Africa. Sub-Saharan Africa (SSA) has 12% of world population but accounts for 70% of world HIV/AIDS infections and deaths. This sub-continent is a home to more than 25 million people living with HIV/AIDS (PLWHA). Ethiopia is classified (along with Nigeria, China, India and Russia) as belonging to the 'next wave countries' with large populations at risk from HIV infection, which will eclipse the current focal point of the epidemic in central and southern Africa [3].

The AIDS pandemic is taking and will continue to take a devastating toll on human lives. According to the 2002 Revision of the United Nations World Population Prospects, life expectancy at birth has already fallen by more than 10 years in the most affected countries [4]. In Ethiopia HIV/AIDS is a major public health problem. An estimated total of over 1.5 million adults and children were infected and living with the virus as of the end of the year 2003 [5]. Many of these people living with HIV do not know that they are infected. Up until now, only a small percentage of those with HIV/AIDS have had access to reliable voluntary counseling and testing services. As there is no cure for HIV/AIDS, voluntary HIV counseling and testing remains a key strategy to control the spread of HIV and to provide care and support to those who live with the virus. The government of Ethiopia has developed a national policy on HIV/AIDS which is designed to guide the implementation of successful programs to prevent spread of the infection [6,7].

Many people in Ethiopia living with HIV/AIDS do not know that they are infected. Up until now, only a small percentage of those with HIV/AIDS have had access to reliable voluntary counseling and testing (VCT) services. Examining and understanding factors associated with VCT acceptance and Antiretroviral Therapy (ART) services are also a vital and timely activity to facilitate HIV prevention efforts. These determinant factors are expected to differ from community to community. The impact of identifying factors affecting VCT acceptance also helps to promote the services in the prevention and control of HIV/AIDS [8-12].

A PLWHA estimate in Ethiopia is about 1 million, and prevalence in the urban and rural population is 7.7% and 0.9% respectively [13-16]. Studies have ascertained characteristics of VCT clients and monitored their sero-status at health centers. Clients infected with

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Received: July 03, 2013 **Accepted:** January 20, 2014 **Published:** January 24, 2014

the HIV have different outcomes following registration in the clinic, commencement of ART and follow-up. Some of these patients may improve following adequate VCT and/or ART services, while others become worse. In some instances, the presentation of patients receiving adequate VCT and/or ART services may not change while others die during this period. Hence, while some patients on ART will continue with the therapy and follow-up clinic, others will be discovered to have dropped out due to death, lost and drop. An analysis of such health facility data on those factors affecting the outcome of HIV/AIDS patients is limited particularly in north western Ethiopia where this study was conducted. Therefore, this study tried to fill this gap in estimating the prevalence of HIV infection, and describing the socio-demographic and other related factors which could affect the follow-up of ART clients at Government and Private Health institutions of the Gondar town.

Materials and Methods

Study area

This study was conducted at Gondar, the capital of North Gondar administrative zone of Amhara regional state, which is located 710 km North West of Addis Ababa. The study area has an altitude of 1850 meters above sea level, an average annual rainfall of 850 mm, minimum and maximum temperature averages are 8.9 and 26°C, respectively and an average relative humidity of 58%.

Study design

Cross-sectional study design was used to collect the retrospective data for estimating the prevalence of HIV infection among VCT users. Qualitative study design with in-depth interview was also employed to support the quantitative component for the assessment of socio-demographic and other related factors affecting the follow-up status of ART followers in the Gondar town, from July 2009-December 2010.

Twelve health institutions were considered for this study; six private and six owned by the government; these institutions commenced service provision in the town at different dates. Most of these health institutions provide, VCT services but not ART and patients have to procure or acquire ART from health institutions such as the University of Gondar Hospital (UOGH) and Gondar Health Center (Poly clinic) where the drug is available. UOGH is a teaching hospital and the only referral health institution for North West Ethiopia serving a population of about 5 million.

Study population

The study utilized all records of patients in those health institutions that have adequate VCT and/or ART services which included good record systems of clients. The designation of a good record system was based on the availability of a standard/comprehensive record list, orderliness and inclusion of the required measurements.

Inclusion criteria

All records of individuals who utilized the VCT service of the health institutions from July 2005 to July 2009 and received ART from July 2004 to July 2007 were included in the study. Also, patients who were on ART for at least three years and volunteered to participate in the in-depth interview were enrolled in the study.

Pretest and data collection instruments

Pretest was done in four private and four government health institutions in the town so that the acceptability, applicability of procedures and tool were checked. Revision was made on the check-lists to confirm the available information recorded in all institutions. This pretest was done by the investigator, supervisor and data collector.

Structured and pre-tested check-lists were used to collect the data from the database of the health institutions. Interview guides were also used for in-depth interview of voluntary ART clients. Three qualified nurses (2-males and 1-female) were trained for two days and made to participate in the pre-testing of the check-lists and collecting of data. The principal investigator and a nurse with B.Sc. degree qualification supervised the data collection process, incomplete and inconsistent data were identified and the necessary corrections were made on the field.

Data analysis

Data were entered using EPI-info version 2002 [17], and before doing the analysis, the entire data were cross checked for reliability. Analysis was performed using SPPS version 16. For different variables, frequencies, odds ratio (OR), 95%CI and P-value were also computed to assess the degree of association between dependent and independent variables. Framework analysis procedure was employed to analyze the qualitative component of the study. After the analysis decoding was made back to original variables to write up the findings.

Ethical considerations

Ethical clearance was obtained from the ethical committee of the School of Public Health, Gondar College of Medicine and Health Sciences, University of Gondar. An official letter of cooperation was also collected from Gondar College of Medicine and Health Sciences, School of Public Health to each of the study health institutions and informed consent was obtained from each voluntary participant of the study. Respondents and data clerks were informed about purpose of the study. Interview was continued with those volunteers who gave verbal consent to participate.

Confidentiality of information was maintained during this study. Whenever any ART client who stopped or wished to stop was found during data collection, appropriate advise was made to facilitate adherence to drug therapy and contact his/her counselor. The information that was collected during the study was stored in a file, without the name of the study subjects, but a code number was assigned to it. Such information would not be revealed to anyone except the principal investigator and will be kept locked with key. To keep privacy and obtain reliable responses, the study subjects were interviewed separately from other individuals, by interviewers of similar sex.

Results

A total of 47,830 VCT clients and 942 ART charts were found during the specified period of data collection. The overall prevalence of HIV infection among the VCT clients was found to be 19.8% (9464) and from the ART charts, 68.7% (647) of them were still following the ARV treatment.

Socio demographic profile of VCT clients

A total of 47,830 clients were found from both private and government owned VCT centers. From these clients; a little over half 24459 (51.1%) were females, most of them were in the age range of 20-24 years 18002 (37.6%), urban residents 43946 (91.9%), Orthodox religion practitioners 44454 (92.9%), Amhara in ethnicity 46319 (96.8%), never married 29652 (62%) and educated up to secondary

level 18376 (38.4%). According to VCT records, almost all clients 47734 (99.8%) had their blood tested following pre-test counseling, of which about one-fifth of them 9464 (19.8%) had test results which were HIV positive (Table 1).

Prevalence of HIV infection

In this study, the prevalence of HIV infection varied by the different characteristics of the VCT. As presented in Table 2, out of the total of 9464 sero-positive clients, more than half 5453 (57.6%) were females and the great majority of them live in urban communities 8124 (85.8%). Most of these clients are in the age groups (20-24), (25-34) and (35-49) with a proportion of 2203 (23.3%), 2648 (28.0%) and 2552 (27.0%) respectively. Similar to VCT demographic characteristics, most of the clients practiced orthodox religion 8954 (94.6%) and were of the Amhara ethnic group 9294 (98.2%). Almost 37% of the sero-positive clients (3478) were divorced and another one-quarter (2448) of them were married, unlike the VCT clients who mostly had never married. Nearly one-third 3018 (32%) of these clients attend secondary school and these test results were obtained from governmental health institutions 8494 (90%) while 2680 (28%) of the total clients were found to be referred to ART.

Specific prevalence of the infection

The specific prevalence of HIV infection varies with respect to different categories. As can be seen from Tables 1 and 2, among 3884 rural and 43946 urban residents who have been provided with VCT services in the town, a higher proportion 1340 (34.5%) and a relatively small proportion of them 8124 (18.5%), respectively in rural and urban were found to be infected with the virus. Sex specific prevalence of HIV was found to be high in females 5453 (23.3%) as compared to males 4011 (16.4%) whereas age specific prevalence were high among the age groups 35-49 years; 2552 (35.3%), 25-34; 2648 (31.5%) and over 50 years; 830 (29.6%). With respect to marital status, the virus was found to be high among divorced 3478 (48.5%) and widowed 1776 (48.4%) categories of clients. The prevalence of the disease was high among clients who were educated up to primary school level 2827 (30.8%) and illiterates 1256 (29.4%) while those clients who were housewives and those employed in government institutions had high prevalence which was 2292 (22.7%) and 1158 (21.7%) respectively.

Analysis of the overall occurrence of the infection in relation to different variables among the VCT clients showed that the infected urban residents accounted for 8124 (17.0%) out of which 5453 (11.4%) are females. Similarly, 2648 (5.5%), 2552 (5.3%) and 2203 (4.6%) of the total VCT clients were found to be within the age groups of 25-34, 35-49 and 20-24 years among those infected respectively.

Age-Sex specific prevalence of the infection

As can be shown from Table 2 below, age-sex specific prevalence of HIV infection varies with different age categories. Under the age group of 0-4, results revealed that females were infected with the virus nearly twice as much as males 98 (30.2%) and 30 (15.4%) respectively. Similarly, females were found to be more than double the males infected with the disease 1613 (18.6%) and 590 (6.3%), respectively in the age group of 20-24. The age groups 25-34 and 35-49 also show high occurrence of the infection in females with respective prevalence of 1440 (35.7%) and 1395 (39.4%), compared to the male clients among whom values of 1208 (27.6%) and1157 (31.4%) were found. These results in combination led to an overall prevalence of HIV infection of 5453 (23.3%) and 4011 (16.4%) in females and males respectively.

Follow-up status of ART clients

From the total of 1500 ART charts reviewed during the study period with a minimum of three years follow-up on ART service, 942 completely filled charts were found. Most patients were still making use of the service (647 clients) while the others were not as a result of death (126 clients), drop out (112 individuals) and being lost to follow-up for different reasons (57 clients).

Factors affecting follow-up status of ART

ART clients have been affected by a number of socio-demographic, socioeconomic and behavioral factors which may either lead to continuation with or withdrawal from ART follow-up. The binary logistic regression analysis demonstrates most of these variables are associated with each other (Table 3). This relationship was examined on 942 ART charts. During the analysis of ART follow-up status,

Table 1: Distribution of VCT Clients by their socio-demographic and other related variables, Gondar town, October, 2009.

Variables	Frequency(N=47830)	Percent (%)
Place of residence		
Urban	43948	91.88
Rural	3884	8.12
Sex		
Female	24459	51.14
Male	23371	48.86
Age group		
0-4	520	1.09
5-14	1329	2.78
15-19	9540	19.95
20-24	18002	37.64
25-34	8406	17.57
35-49	7227	15.11
50+	2806	5.87
Marital Status		
Never married	29652	61.99
Married	7328	15.32
Divorced	7178	15.01
Widowed	3672	7.68
Religion		
Orthodox	44454	92.94
Muslim	2018	4.22
Others	1358	2.84
Ethnicity		
Amhara	46314	96.84
Tigrie	871	1.82
Others	640	1.34
Educational Level		
Illiterate	4266	8.92
Primary	9164	19.16
Secondary	18376	38.42
Tertiary	16024	33.50
Occupational Status		
Housewife	10102	21.12
Private	10308	21.55
Daily laborer	13660	28.56
Governmental institution	5332	11.15
Others	8428	17.62
Types of Testing Institution		
Government	43093	90.10
Private	4737	9.90
Test result		
Positive	9464	19.79
Negative	38366	80.21
Reasons of Test		
To know his/her status	45229	94.56
Provider initiated	1737	3.63
For marriage	864	1.81

Note: N= total number of VCT clients.

Table 2: Age-specific prevalence of HIV infection among VCT clients by sex, Gondar Town, October 2009.

Age Group	Number of clients tested (N=47830)			Number of positive lients(n=9464)			Prevalence (%)
	Male	Female	Total	Male SPm(n1)	Female SPf(n2)	Total	
0-4	195	325	520	(15.4)30	(30.2)98	128	**24.62**
5-14	788	541	1329	(28.1)221	(26.4)143	364	**27.39**
15-19	4614	4926	9540	(7.9)366	(7.6)373	739	**7.75**
20-24	9329	8673	18002	(6.3)590	(18.6)1613	2203	**12.24**
25-34	4372	4034	8406	(27.6)1208	(35.7)1440	2648	**31.50**
35-49	3689	3538	7227	(31.4)1157	(39.4)1395	2552	**35.31**
50+	1472	1334	2806	(29.8)439	(29.3)391	830	**29.58**
Total	24459	23371	47830	(16.4)4011	(23.3)5453	9464	**19.79**

Note: N= Total number of VCT clients, n= Total number of sero-positive clients, n1=Number of male sero-positive clients, n2= Number of female sero-positive clients, SPm= Specific prevalence of males, SPf=Specific prevalence of females.

all important variables were included in the model. However, those variables which had a considerable and statistically significant effect at ($p<0.05$) on ART follow-up status were considered to find the crude odds ratio (COR). Some of those statistically significant variables on COR model has been lost on adjusted odds ratio (AOR) model like residence, previous sexual behavior and addiction to soft drugs.

Among these study subjects 556 (70.47%) of the urban residents and 91 (59.48%) of the rural residents continued with the ART service. The area of residence, whether urban or rural, showed no significant difference with regard to ART follow-up status [AOR; 0.95, 95%CI: (0.58, 1.53)]. Regarding sex, 420 (71.43%) of the females and 227 (64.12%) of the males continued to use the ART follow-up service. There was significant sex difference among males and females in ART follow-up status [AOR; 1.70, 95%CI: (1.15, 2.51)]. Those ART clients who have 1 and more than 4 family member were found to be 4.01 and 4.02 times respectively more likely to continue with ART follow-up compared with those clients who had no family member [AOR; 4.01, 95%CI: (2.45,6.56)] and [AOR; 2.57, 95%CI: (1.46,4.53)] respectively.

Provision of community and religious supports or lack of these supports was associated with different results; 513 (76%) of the clients who lacked community support and 134 (50.19%) of those clients provided with community support were found to continue with the ART service while 504 (72.62%) of those patient who maintained their clinic follow-up schedule had religious support and 143 (57.66%) of those clients who lacked religious support were found to continue with follow-up clinic. The values got for both groups were statistically significant [AOR; 4.97, 95%CI: (3.35, 7.36)] for community support and [AOR; 3.59, 95%CI: (2.39, 5.41)] in case of religious support. On the other hand, there was variation in the duration of follow-up status of those who continued with ART follow-up; 256 (73.99) of the clients with four years of follow-up and 108 (83.72%) of those clients with five years of follow-up were found to keep up with the ART service. These were also statistically significant [AOR; 1.94, 95%CI: (1.33, 2.83)] and [AOR; 4.20, 95%CI: (2.30, 7.65)] respectively.

Results of in-depth interview on voluntary ART followers

For in-depth interview, 24 volunteers on ART were selected during data collection period. Out of these clients, 15 were females, 19 clients were over 30 years of age and nearly all (20 clients) were urban in residence. Most of them (13 clients) were educated up to secondary school level and 16 clients were found to be ready to accept the recommendations of the counselor.

After clients are found to be HIV positive, most of the counselors (both VCT and ART) encourage clients to choose the right way of managing themselves so that they would have healthy life. Most of these voluntary clients (16 clients) stated that the role of the counselor in his/her compliance was an important factor for their current follow-up, these counselors were described as being patient "tagashnet" while the other key factor mentioned by many (13 clients) of them were availability of the service "*kirbe mehonu*" which may be due to the fact that most of the volunteers were urban in residence. On the other hand, those factors mentioned by the majority (15 clients) which they claimed discouraged ART follow-up were stigma and discrimination practiced by neighbors, friends and different members of the community.

In general, a lot of factors have been raised by voluntary ART volunteers through in-depth interview. Some of the most important factors mentioned by many volunteers of the study in promoting ART follow-up status were: patience on the part of the ART counselor, availability of the service, family acceptance, mass media coverage, community and religious supports while those factors discouraging compliance with follow-up among patients on ART include: unavailability of the service in most health institutions such as those in this study with VCT service only, low income level, stigma and discrimination, lack of patience of the counselor and over treatment of the community.

Discussion

This survey revealed a relatively higher prevalence of HIV infection compared to the country's urban prevalence figure which is 13.7% [18]. This difference might be because country's figure is obtained by taking samples which reflect the whole Ethiopian towns while this study is done only in Gondar town by taking the whole VCT data. On the other hand, the prevalence figure is comparatively lower relative to the study results of the Addis Ababa done at a particular VCT center (24.5%) [19]. This could be attributed to the difference in the whole socio-demographic structure of the study populations, difference in the tendency of the study population to test their HIV status and difference in encouragement levels made by the media for VCT.

Socio-demographic distribution of sero-positive clients in these health centers showed that the great majority of them are urban residents similar to VCT clients and more than half of the sero-positive clients were females. With respect to age groups, unlike their prevalence, most positive clients were found in the age groups of 25-34, 35-49, and 20-24 years. On the other hand greater proportion of the sero-positive clients in relation to marital status was those who were married and divorced individuals. Despite this high figure of

Table 3: Logistic regression outputs: Association of ART Follow-up status Vs Socio-demographic and other related variables (n=942) of ART followers in Gondar Town, October 2009.

Variables	ART follow-up status			
	N (%)	N (%)	Crude OR (95% CI)	Adjusted OR (95% CI)
Place of residence				
Urban	556(70.5)	233(29.5%)	1.63(1.14, 2.32)	0.95(0.58, 1.53) x
Rural	91(59.5)	62(40.5)	1.00	1.00
Sex				
Female	420(71.4)	168(28.6)	1.40(1.06, 1.85)	1.70(1.15, 2.51) XX
Male	227(64.1)	127(35.9)	1.00	1.00
Employment status				
House wife	138(69.3)	61(30.7)	1.00	1.00
Private	120(59.1)	83(40.9)	0.64(0.42, 0.96)	1.07(0.63, 1.83) XX
Daily laborer	192(71.4)	77(28.6)	1.10(0.74, 1.65)	1.68(0.99, 2.83) XX
Govt. emp.	68(64.8)	37(35.2)	0.81(0.49, 1.34)	1.42(0.73, 2.73) XX
Others	129(77.7)	37(22.3)	1.54(0.96, 2.48)	2.75(1.50, 5.04) XX
No. of families in the household				
Zero				
One	82(44.8)	101(55.2)	1.00	1.00
Two	214(78.4)	59(21.6)	4.47(2.97, 6.73)	4.01(2.45, 6.56) XXX
Three	179(74.9)	60(25.1)	3.68(2.43, 5.55)	4.02(2.42, 6.70) XXX
Greater than four	88(71.5)	35(28.5)	3.10(1.90, 5.05)	3.87(2.13, 7.04) XXX
	84(67.7)	40(32.3)	2.59(1.61, 4.16)	2.57(1.46, 4.53) XXX
Clinical presentation				
Ambulatory	541(71.8)	212(28.2)	2.47(1.66, 3.67)	1.96(1.16, 3.32) x
Working	47(64.4)	26(35.6)	1.75(0.96, 3.19)	2.59(1.12, 5.99) x
Bed Ridden	59(50.9)	57(49.1)	1.00	1.00
Duration on ART				
Three	283(60.6)	184(39.4)	1.00	1.00
Four	256(74.0)	90(26)	1.85(1.37, 2.51)	1.94(1.33, 2.83) XXX
Five	08(83.7)	21(16.3)	3.34(2.02, 5.53)	4.20(2.30, 7.65) XXX
Community support				
Yes	134(50.2)	133(49.8)	1. 00	1. 00
No	513(76.0)	162(24.0)	3.14(2.33, 4.23)	4.97(3.35, 7.36) XXX
Religious support				
Yes	504(72.6)	190(37.4)	1.95(1.44, 2.64)	3.59(2.39, 5.41) XXX
No	143(57.7)	105(42.3)	1.00	1.00
Previous sexual Behavior				
Regular sexual partner	430(72.1)	166(27.9)	1.54(1.16, 2.04)	1.33(0.93, 1.91) x
No regular sexual partner	217(62.7)	129(37.3)	1.00	1.00
Alcohol addiction				
High	323(72.9)	120(27.1)	1.00	1.00
Low	209(56.8)	159(43.2)	0.49(0.36, 0.66)	0.50(0.34, 0.72) XXX
Not at all	115(87.8)	16(12.2)	2.67(1.52, 4.69)	1.81(0.95, 3.44) XXX
Addiction on soft drugs				
High	72(69.9)	31(30.10	1.01(0.65, 1.58)	2.00(1.04, 3.80) x
Low	32(53.3)	28(46.7)	0.50(0.29, 0.84)	1.12(0.55, 2.32) x
Not at all	543(69.7)	236(30.3)	1.00	1.00
Intention to accept recommendations of the counselor for alcohol addiction				
High	627(71.9)	245(28.1)	6.40(3.73, 10.97)	13.23(3.99, 43.93) XXX
Low	20(28.6)	50(71.4)	1.00	1.00
Intention to accept recommendations of the counselor for soft drug addiction				
High	630(71.9)	246(28.1)	7.23(4.08, 12.82)	4.47(2.07, 9.62) XX
Low	17(22.7)	58(77.3)	1.00	1.00

Note: 1.00=Reference category, Yes=Following ART, No=Not Following ART, x=p>0.05, xx=p<0.05, xxx=p<0.001, OR=Odds ratio, Govt. emp.=government employed.

those who were sero-positive, the prevalence might be low since it depends on the total number of tested clients in a particular category like married clients.

The specific prevalence of urban and rural residents was found to be 18.5% and 34.5%, respectively. This high prevalence of the infection among rural residents could be due to the fact that only chronically sick clients would be referred to test themselves, small proportion of tested rural clients, low perception of the rural residents about the role of VCT and other reasons. Female clients were more likely to be HIV positive than males. This pattern of female vulnerability to HIV/AIDS infection is commonly seen in many other studies [17,19] perhaps due to the biological factors as well as the prevailing low socioeconomic status of women and other cultural influences.

The age pattern for HIV prevalence rates among VCT clients in Gondar Town VCT Health Centers revealed that the figure is higher among older clients than younger ones. Clients aged 35-49 years exhibited the highest (35.3%) HIV infection rate followed by those aged 25-34 age groups (31.5%). This may be due to the fact that the

infection may pass unnoticed in young ages, since there is no cure, the probability of transmission will continue, as a chronic infection the proportion of sero-positive clients will increase with age and other reasons. The observed age pattern of HIV prevalence figure in this study is comparable with that for other similar studies conducted in Addis Ababa at Bethezatha VCT project, and Family Guidance Association of Ethiopia [17].

On the other hand those clients who were educated up to primary school level exhibit a relatively high HIV infection 2827 (30.8%) followed by those clients who did not have any formal education (Illiterates) with the respective prevalence of 29.4% (1256). Though the illiterates had the lowest prevalence rates among the sero-positive clients reviewed in this study, infection rate was not significantly different when those educated up to primary school level were compared with those clients who were more educated The low prevalence rate of the illiterates was similar to that of rural residents, probably because most of the clients coming from rural areas were illiterates with similar lifestyles and exposure trends as regards HIV. Even though the total proportion of clients tested in private health institutions was relatively low, their respective prevalence figure had been found to be more or less similar.

The prevalence of HIV infection on the basis of age and sex revealed, high rates among the female study subjects in most age groups. Particularly in the age groups of 0-4 and 20-24 years, the occurrence of the infection had been found to be twice higher in females than males. This variation could occur due to variation in the total proportion of clients visiting VCT centers, besides the high natural vulnerability and low socio-economic status of females.

According to the results of a binary logistic regression analysis, most of the socio demographic variables included in the equation were found to be significantly related to the ART follow-up status of HIV infection. However, residence, age group, marital status and educational level of ART clients which had significant effect on the prevalence of HIV infection, were found to be statistically insignificant. On the other hand, sex of clients, employment status, number of families in the house hold, availability of community and religious supports, intention of the client to accept recommendation of the ART counselor and duration of the client on ART appeared to be important variables in determining the ART follow-up status. Some of these variables have high coefficients suggesting that they were extremely important in determining the client status.

Most of those variables affecting ART follow-up status were also raised during voluntary based in-depth interview with ART followers. This interview revealed that the availability of the service, exercise of patience by the counselor; better mass media coverage, community and religious supports, and good family understanding were some of the encouraging factors mentioned by ART followers. Unavailability of the ART service in many health institutions like VCT, lack of patience by the counselor, stigma, discrimination, residence, insufficient income and over treatment of the ART followers were some of the factors mentioned by the volunteers that discourage their compliance with ART follow-up.

The influence of residence on ART follow-up status had been found to be significant on crude OR, while it disappears on the adjusted model which could be due to confounding or combination effect. Besides the high prevalence of the infection in females, they were found to be more likely to comply with follow-up clinics than males [AOR; 1.70, 95%CI: (1.15, 2.51)]. On the other hand the proportion of clients who follow-up on ART schedule decreased as the number of family members increased. Those clients living with one family member were found to be four times more likely to comply with clinic schedule [AOR; 4.01, 95%CI: (2.45, 6.56)] while those who live with four or more family members do so more than twice when compared with those who live alone. [AOR; 2.57, 95% CI: (1.46, 4.53)]. This could occur due to the fact that as the number of people in the family increases, the variation of ideas could also increase such that while there may be those members of family who will discourage re-visits to clinic for review and ART continuation, others may encourage continuation, the plethora of ideas may actually confuse the patient and result in abstinence from clinic. The presence of community and religious supports play an important role in the prevention and control of HIV infection, but availability of community support in this study was inversely associated with continuation of ART therapy by the clients. Those ART clients who lack community support were nearly five times more likely to continue with ART [AOR; 4.97, 95% CI: (3.35, 7.36)] than those provided with sufficient community support. On the contrary, those ART clients with religious supports were nearly four times more likely to continue with therapy [AOR; 3.59, 95%CI: (2.39, 5.41)] compared to those who lacked religious supports. The reason for influence of community support on compliance with therapy got in this study is not clear. Most of the patients on ART who had continued with their clinic appointment have been associated with different degrees of alcohol addictions while some of them were found to be addicted to soft drugs such as *Catha edulis (khat)* which is a plant grown in the countries around the Red Sea. There are several *names* for the plant, depending on its origin. On the other hand, these clients have different intentions to accept the recommendations of the counselor with respect to their follow-up and health status. Hence, this study found that, those ART clients who had no alcohol addiction at all were nearly two times more likely to comply with follow-up than those clients associated with high alcohol addiction and those ART clients associated with high intention to accept their counselor's recommendation on alcohol and soft drug addiction were found to be more than ten times more likely to continue with their ART follow-up clinic than those clients associated with low intention for the counselor's recommendations. This may be due to the fact that those clients who were not addicted at all placed more value on their health and accepted the recommendations of the counselor and hence attended their ART follow-up better than those who are highly addicted.

The ART follow-up status of clients also differs with respect to previous duration of clients on it. With the passing on of time, the probability of these clients keeping to follow-up appointment increased. Those clients on ART for about five years were found to be four times more likely to continue [AOR; 4.20, 95%CI: (1.33, 2.83)] than those clients who had attended the follow-up clinic for about three years. This might be due to the experiences and adaptations developed by the client with respect to timing and other precautions of ARV during that relative duration.

Conclusions and Recommendations

It is justifiable to conclude that the overall prevalence of HIV infection among the VCT clients in Gondar town had been found to be high. This figure is more or less similar to the respective result of the urban residents unlike the rural clients' value who tested themselves in the town VCT centers and found to be even higher.

The specific prevalence of HIV infection was found to be higher in females, clients with primary level education and illiterates, divorced and widowed clients, and those VCT users in the age range of 35-49 years. In most of the age groups, females were associated with high prevalence similar to the overall prevalence figure.

Most of the reviewed charts revealed that the clients were adherent to their ARV. Follow-up status of patients in ART follow-up clinic had been affected by a number of socio-demographic and other related factors. Some of the most important factors identified in the study affecting the follow-up status of ART clients on ARV were; the number of family members in the household, availability of community and religious supports, intention of the client to accept the recommendations of the counselor on behavior as regards addiction to alcohol or soft drink and duration on ART. Other factors like sex of the client and clinical presentation of the client during ARV commencement were also found to affect clients ART follow-up. Based on the above conclusions, the following recommendations were made:

- There is a need for coordinated and intensified intervention strategies to be implemented by governmental and non-governmental organizations to curb further rise in the number of people infected with the virus in the study area.

- There is also a need to intensify prevention and mitigate efforts with special focus on females so as to decrease their vulnerabilities to HIV infection and improve accessibility of ART services in many health institutions of Gondar town.

- There is a need to bring about an appropriate behavioral change communication strategy to those particular segments of the population of the study area which are associated with high HIV infection to help them in bringing about meaningful behavioral change and for leading a healthy life.

- Considering the prevailing high HIV infection rate and to strengthen ART services in the town, strong referral linkages with different health services have to be established with community based organizations and NGOs for care and support, follow-up counseling, home based care, as well as social and financial support.

- Data clerks of VCT and ART should be trained to fill all the important information of their clients. Besides these, further studies on regional as well as national basis by using completely filled VCT registration books and ART charts are recommended which could reflect the real picture of the target population.

The epidemic in rural population seems to be relatively high; hence measures should be taken in collaboration with governmental and non-governmental organizations to control the HIV infection before it takes a debilitating grip on the rural community.

Acknowledgements

We would like to thank University of Gondar, College of Medicine and Health Sciences, School of Public Health for the grant provided to us to do this` research. We wish also to express our profound gratitude to personnel of Faculty of Veterinary Medicine for their unreserved guidance, valuable suggestions and for volunteering to do this research.

References

1. Assefa B (1994) A study on the Socio Economic Impact of HIV/AIDS on the Industrial Labor Force in Ethiopia. Addis Ababa, Ethiopia.
2. UNAIDS/WHO (2005) AIDS epidemic update: Joint United Nation Program on HIV/AIDS, World Health Organization, Geneva, Switzerland.
3. UNAIDS (2002) In-depth study of knowledge, Attitude, Behavior and Practice (KABP) of Internally Displaced Persons (IDPs) in Ethiopia towards HIV/AIDS and their Health status and Medical Care Assessment, Miz-Hazab Research Center.
4. United Nations (2003) World Population Prospects: The 2002 Revision. Sales No. E.03.XIII.6.
5. Disease Prevention and Control Department, MOH (2004) AIDS in Ethiopia, Fifth Report.
6. Garbus L (2003) HIV/AIDS in Ethiopia, Country AIDS Policy Analysis Project, AIDS Policy Research Center. University of California, San Francisco.
7. Ministry of Health (2004) AIDS in Ethiopia. (5th Edn), Ministry of Health, Disease Prevention and Control Department, Addis Ababa, Ethiopia.
8. Federal Ministry of Health (2002) National Guideline for VCT in Ethiopia. Disease Prevention and Control Department, Federal Ministry of Health, Addis Ababa, Ethiopia.
9. Ministry of Health (2001) Strategic Framework for National Response to HIV/AIDS in Ethiopia, Addis Ababa, Ethiopia.
10. Bartoli E, Capron JP (2000) [Epidemiology and natural history of cholelithiasis]. Rev Prat 50: 2112-2116.
11. National AIDS Council (2000) Regional HIV/AIDS implementation plan for Benshangul Gumze National Regional State: 2001-2002.
12. Ministry of Health (2000) AIDS in Ethiopia. (3rd Edn), Disease Prevention and Control Department, Ministry of Health, Addis Ababa, Ethiopia.
13. World Health Organization (2002) Scaling up antiretroviral therapy in resource-limited settings: Guidelines for a public health approach, Geneva, Switzerland.
14. World Health Organization (2005) Progress on global access to HIV antiretroviral therapy: An update on '3 by 5.' World Health Organisation, Geneva, Switzerland.
15. Demissie Z (2003) Trends of HIV infection and profiles of voluntary HIV counseling and testing (VCT) service users in seven branch clinics of the Family Guidance Association of Ethiopia. EPHA Abstract 8.
16. National Meteorology Service Agency (2005) Stata Corporation users' guideline.
17. Ministry of Health (2002) AIDS in Ethiopia. (4th Edn), MOH, Addis Ababa, Ethiopia.
18. Korra A, Bejiga M, Tesfaye S (2005) Socio-demographic profile and prevalence of HIV infection among VCT clients in Addis Ababa. Ethiop J Health Dev 19: 109-116.
19. Mulugeta E (2003) Socio demographic characteristics, sexual behavior, and reasons for attending VCT service at Bethezatha VCT project. EPHA Abstract.

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